

Claims

1. A pulse-tube refrigerator comprising a pulse tube, a cool storage unit connected to the low-temperature side of said pulse tube, a vibration generator connected to the high-temperature side of said cool storage unit, and a reservoir with an orifice connected to the high-temperature side of said pulse tube, wherein said vibration generator is a heat-driven pressure-wave generator comprising a heat-driven tube, a phase shifter that is connected to the outlet port of said heat-driven tube at its one end, and a return path that connects the other end of said phase shifter to the inlet port of said heat-driven tube, wherein said heat-driven tube consists of a heat-storage unit, a heating heat exchanger, a radiation heat exchanger, and a work-transmission tube.

2. A pulse-tube refrigerator comprising a pulse tube, a cool storage unit connected to the low-temperature side of said pulse tube, a vibration generator connected to the high-temperature side of said cool storage unit, and a reservoir with an orifice connected to the high-temperature side of said pulse tube, wherein said vibration generator is a heat-driven pressure-wave generator comprising a heat-driven tube and a resonator connected to the low-temperature-side end of said heat-driven tube, wherein said heat-driven tube consists of a heat-storage unit, a heating heat exchanger, a radiation heat exchanger, and a high-temperature buffer.

3. A pulse-tube refrigerator comprising a pulse tube, a cool storage unit connected to the low-temperature side of said pulse tube, a vibration generator connected to the high-temperature side of said cool storage unit, and a reservoir with an orifice connected to the high-temperature side of said pulse tube, wherein said vibration generator is a heat-driven pressure-wave generator comprising a heat-driven tube and a resonator connected to the inlet port of said heat-driven tube, wherein said heat-driven tube consists of a heat-storage unit, a heating heat exchanger, a radiation heat exchanger, and a work-transmission tube.

4. A pulse-tube refrigerator comprising a pulse tube, a cool storage unit connected to the low-temperature side of said pulse tube, a vibration generator connected to the high-temperature side of said cool storage unit, and a reservoir with an orifice connected to the high-temperature side of said pulse tube, and further comprising a gas-spring resonator disposed between said pulse tube and said orifice.

5. A pulse-tube refrigerator comprising a pulse tube, a cool storage unit connected to the low-temperature side of said pulse tube, a vibration generator connected to the high-temperature side of said cool storage unit, and a reservoir with an orifice connected to the high-temperature side of said pulse tube, and further comprising a phase shifter disposed between said pulse tube and said orifice.

6. A pulse-tube refrigerator comprising a pulse tube, a cool storage unit connected to the low-temperature side of said pulse tube, a vibration generator connected to the high-temperature side of said cool storage unit, and a reservoir connected to the high-temperature side of said pulse tube, and further comprising a phase shifter with leakage disposed between said pulse tube and said reservoir.